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**Title:**

Modeling and Analysis of Pseudo-Plateau Bursters

**Abstract:**

In this talk I will present and discuss mathematical models of pseudo-plateau bursting. Specifically I will focus on pituitary somatotrophs and inner hair cells. Pituitary somatotrophs release growth hormone in response to spontaneous calcium entry through voltage-gated calcium channels, which is governed by plateau-bursting electrical activity and is regulated by several neurohormones. Inner Hair Cells are the first receptor cells of hearing and are connected to the afferent nerves. Sound transduction by inner hair cells is mediated via secretion of neurotransmitters. The patterns of secretion are governed by electrical activity, whose amplitude and phase drive auditory nerve firing. Although functionally different these two cellular systems are remarkably similar in regard to the mechanisms that underlie their electrical activity. In both cases our models were validated against experimentally-observed patterns of activity, such as spiking and pseudo-plateau bursting. The involvement of intracellular calcium stores in regulating the intracellular calcium signal, important for local dynamic fine-tuning of the membrane potential dynamics, is studied based on model results.